Probability of an Event

Definition:

**Probability:** ***The chance an event will happen***. It is the ratio of the number of ways an event can occur to the number of possible outcomes.

***no. of ways certain event can occur***

***no. of possible events***

Probability

=

It can be denoted by A.:

**P (A) = n = n (A)**

**N n(S)**

Mathematically:

* A probability is a number ranges from 0 to 1.

* 0 for an event which cannot occur.(Impossible)
* 1 for an event which can occur.(Certain)
* 0 ≤ P (E) ≤ 1.

Given the two events "A" and "B",

P (A) > P (B)

If and only if event "A" is more likely to occur the event "B".

Probability in daily life:

* When we toss a coin. The result of this means the coin can either land on the ‘heads’ side or ‘tails’.
* Rolling of die.
* Choosing a card from deck.
* Pulling a green candy from a bag of red candies.
* Winning a lucky draw
* Predicting the Weather
* There is a high chance of getting the job this year.

Purpose:

The purpose of probability can be thought of as its use informally in our daily lives to plan or make decisions.

Formal probability theory is a fundamental tool used by researchers, health-care providers, insurance companies, stockbrokers and many others to make decisions in contexts of uncertainty.

Like on a day in which the probability of precipitation was forecast at 80 per cent, but skies were sunny all day, you also have to consider that there was a 20 per cent chance that it wouldn’t rain. Still, you made a wise decision to take an umbrella based on the probability you were given.

Examples:

Steps to be followed:

* Determine the sample space or the total number of possible outcomes of the experiment.
* Determine the number of favorable outcomes of the event.
* Divide the value from step 2 by the value obtained in step 1 to get the required probability.

1. Each of the letters HELLO is written on a card. A card is chosen at random from the bag. What is the probability of getting the letter ‘L’?

**Solution:**

As card is **randomly selected**, it means that each card has the same chance of being selected.  
Sample space =S= {H, E, L 1, L 2 , O} ∴There are two cards with the letter ‘L’

Total number of outcomes = n(S) = 5

Let A = event of getting the letter ‘L’ = {L 1, L 2}

P(A) = n(A)/n(S)

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1. **Find the probability of ‘getting 3 on rolling a die’.**

**Solution:**

Sample Space = S = {1, 2, 3, 4, 5, 6}

Total number of outcomes = n(S) = 6

Let A be the event of getting 3.

Number of favourable outcomes = n(A) = 1 ∴ A  = {3}

Probability=P(A) = n(A)/n(S) = 1/6

Hence, P(getting 3 on rolling a die) = 1/6

1. Find the probability of getting 53 Sunday in a leap year.

**Solution:**

A leap year has 366 days. So, it has 52 weeks and 2 days.

So, 52 Sundays are assured. For 53 Sundays, one of the two remaining days must be a Sunday.

For the remaining 2 days we can have

Sample space=S= (Sunday, Monday), (Monday, Tuesday), (Tuesday,

Wednesday), (Wednesday, Thursday), (Thursday, Friday),

(Friday, Saturday), (Saturday, Sunday).

total number of possible outcomes =n(s) = 7.

Number of favourable outcomes for the event E= n(A) = 2

 [ (Sunday, Monday), (Saturday, Sunday)].

Probability=P(A) = n(A)/n(S) = 2/7